

FIG. 1

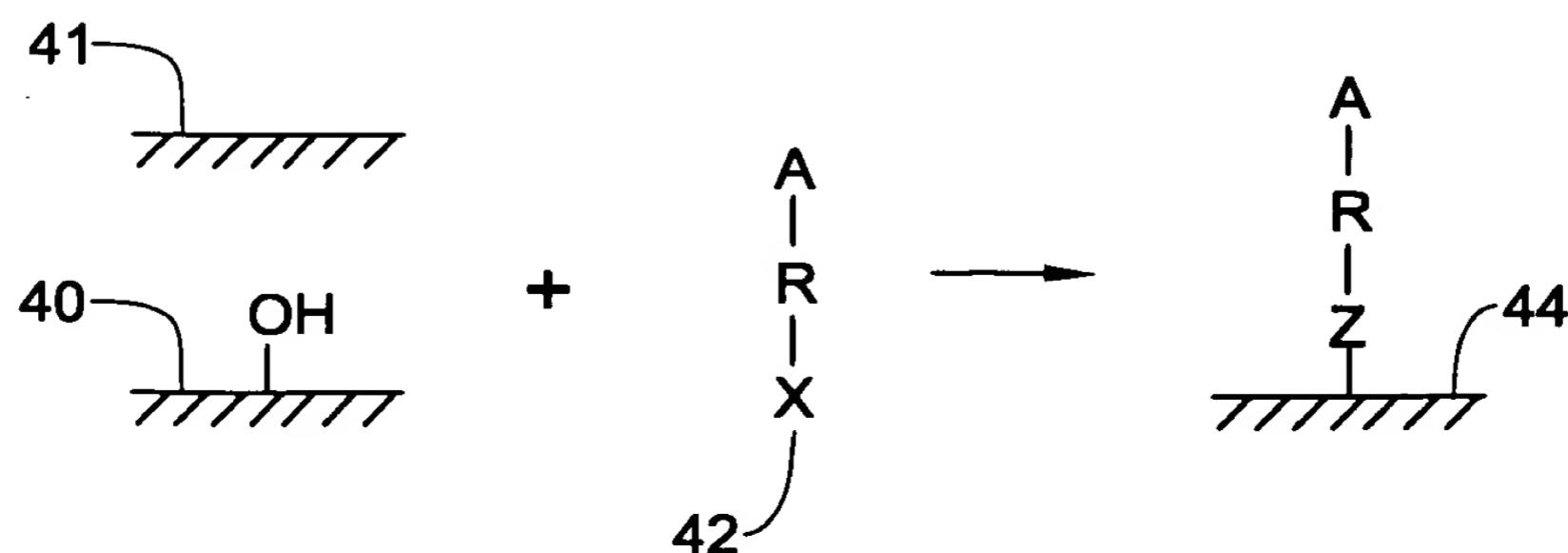


FIG. 2A

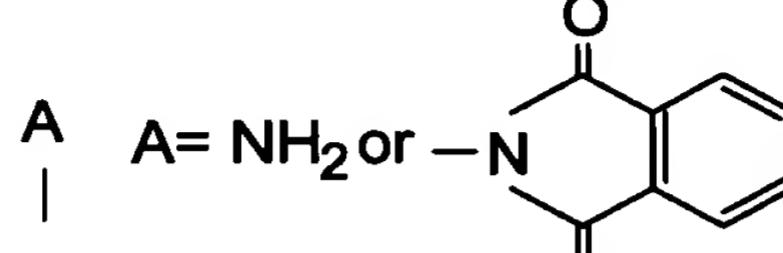
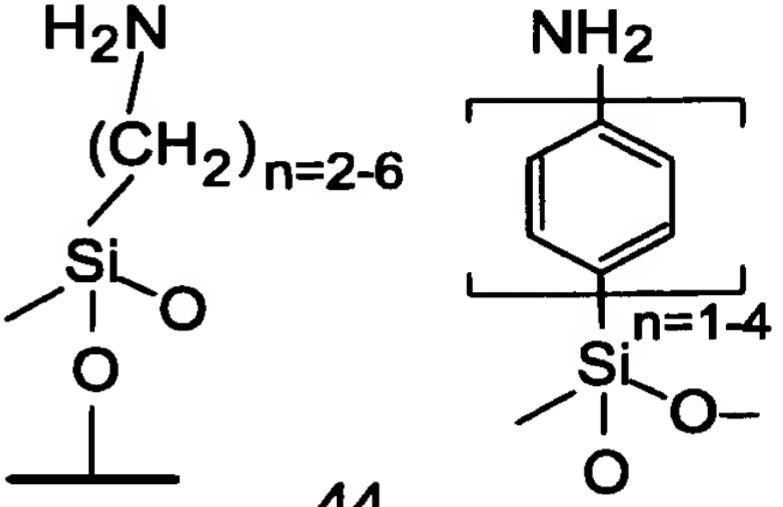
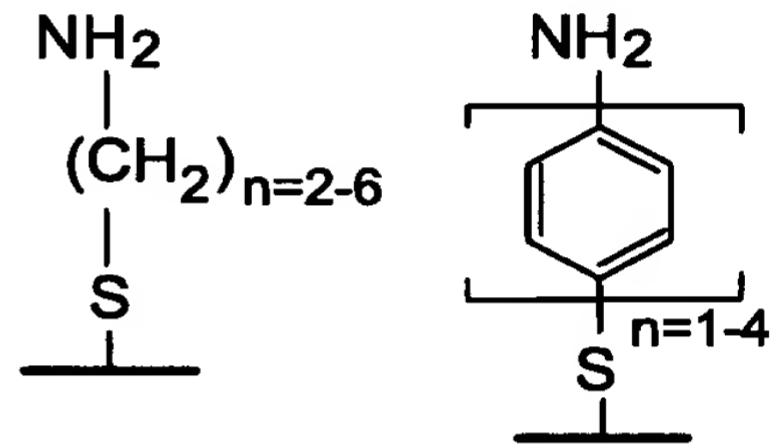
| Substrate  | Coupling Agent<br>(X=silane or thiol)  | Template Layer<br>(Z=siloxane or metal sulfide)   |
|--|--|---|
| $\begin{array}{c} \text{OH} \\   \\ \text{MO}_x \\   \\ \text{M= Si, Ti, In, Fe, ...} \\   \\ 40 \end{array}$                        | <p>A    A= NH<sub>2</sub> or </p> <p>R    R= alkyl or phenyl</p> <p>SiY<sub>3</sub> Y= halogen or alkoxy</p> <p style="text-align: center;">42</p> |  <p style="text-align: center;">44</p>  |
| $\begin{array}{c}   \\ \text{M or MM'} \\   \\ \text{M= Au, Pt, Cu, ...} \\   \\ \text{MM'= GaAs, CdSe, ...} \\   \\ 41 \end{array}$ | <p>NH<sub>2</sub><br/> <br/>R<br/> <br/>SH      or      NH<sub>2</sub><br/> <br/>R      NH<sub>2</sub><br/> <br/>S — S<br/> <br/>R= alkyl or phenyl</p> <p style="text-align: center;">42</p>  |  <p style="text-align: center;">44</p> |

FIG. 2B

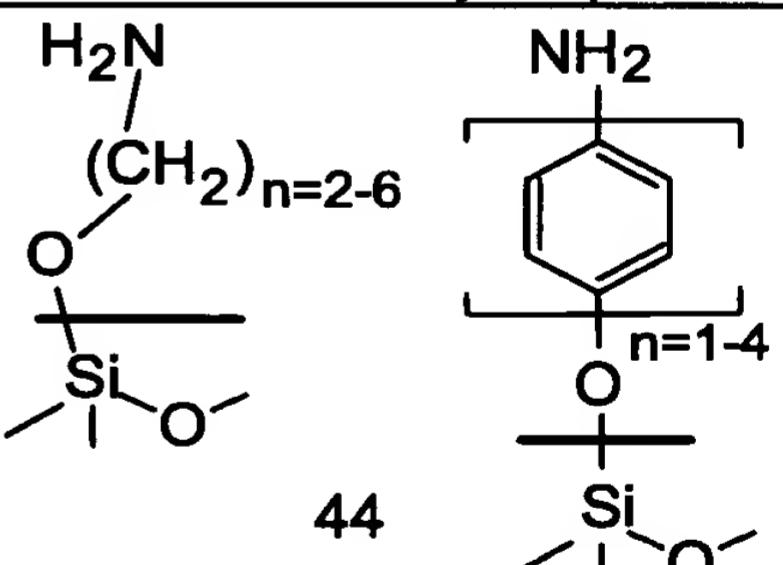
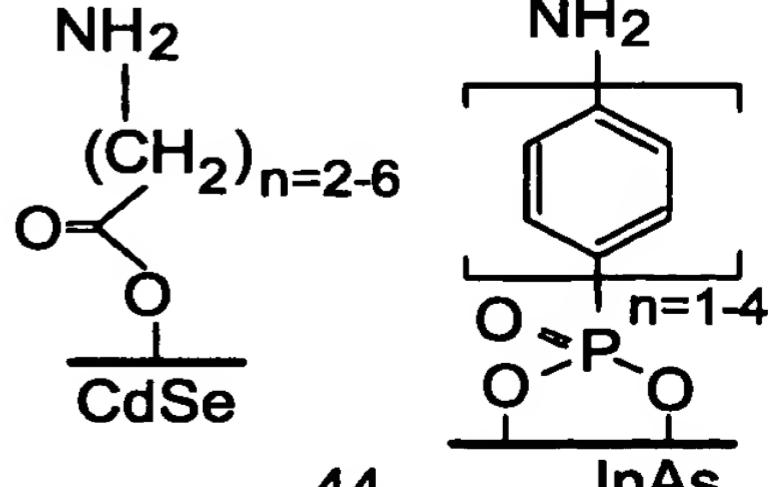
| Substrate  | Coupling Agent<br>(X= OH, CO <sub>2</sub> H, PO <sub>3</sub> H <sub>2</sub> )   | Template Layer<br>(Z= alkoxy silane, phosphate or carboxylate)  |
|--|---|---|
| $\begin{array}{c}   \\ \text{Cl} \\   \\ \text{Si}-\text{O}' \\   \\ 40 \end{array}$ | HO - R - NH <sub>2</sub><br>R= alkyl or phenyl<br><p style="text-align: center;">42</p>   |  <p style="text-align: center;">44</p> |
| $\begin{array}{c}   \\ \text{II - IV} \\   \\ \text{III-V} \\   \\ 41 \end{array}$   | HOOC - R - NH <sub>2</sub><br>(HO) <sub>2</sub> OP - R - NH <sub>2</sub><br>R= alkyl or phenyl<br><p style="text-align: center;">42</p> |  <p style="text-align: center;">44</p> |

FIG. 2B CONT

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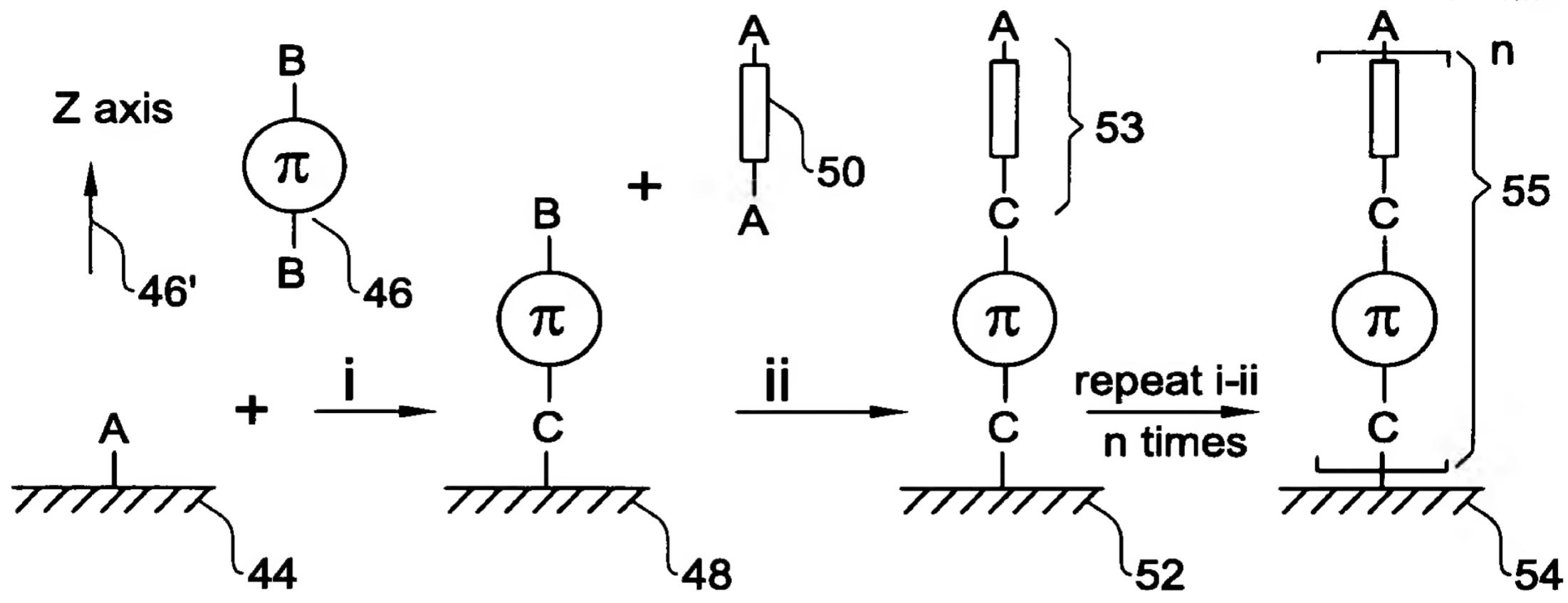
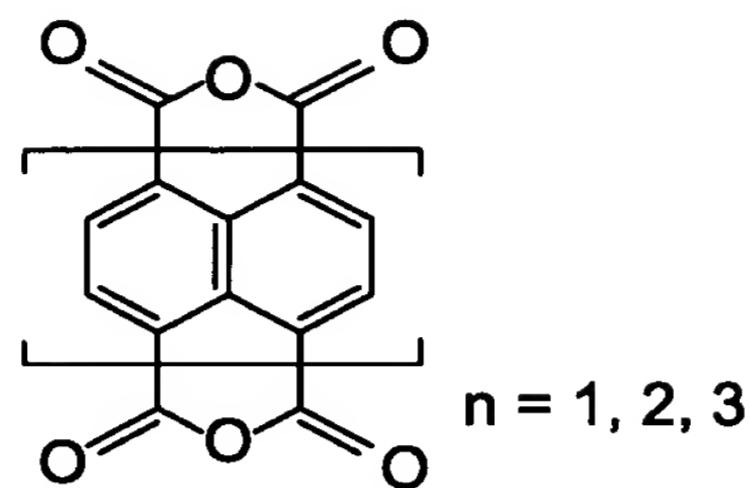
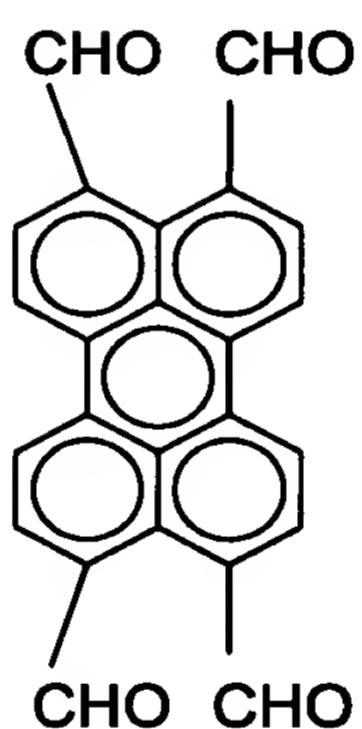
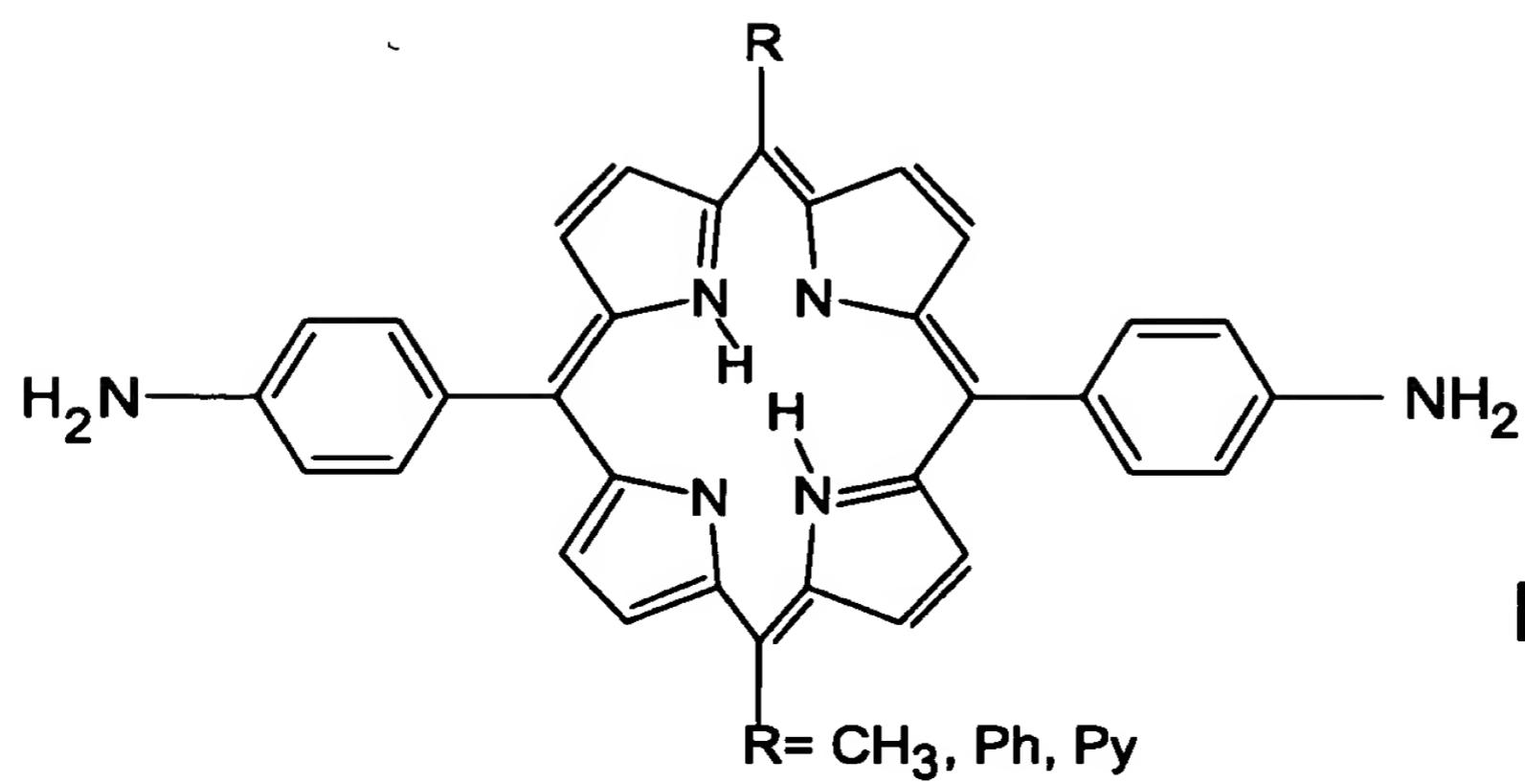


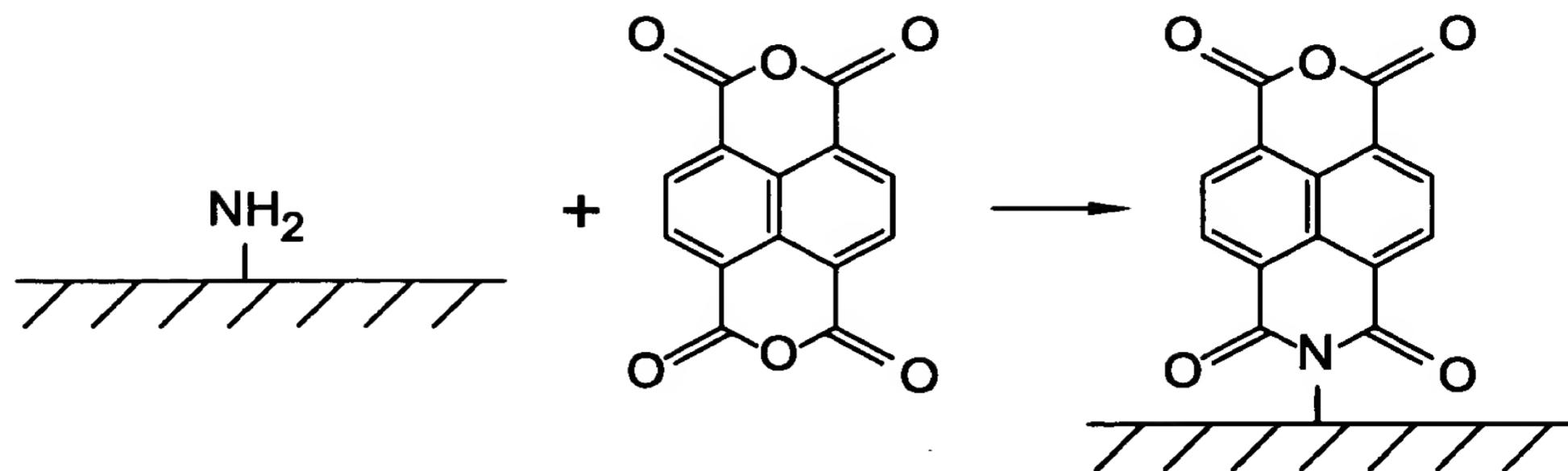
FIG. 3A

| A  | B            | C                         | INS./SC   | COND./SC                      |          |
|--|--------------|---------------------------|---|-------------------------------|----------|
| $-\text{NH}_2$                                   |              |                           | <br>A → A   | <br>B → B                     | INS/COND |
| $\text{R}-\text{NH}_2$<br>$\text{R}-\text{NH}_2$ |              |                           | $-(\text{CH}_2)_n-$<br>$n=1-12$                               | <br>$n=1-6$<br>oligothiophene |          |
| $-\text{NH}_2$                                   | $\text{C=O}$ | $\text{C}\equiv\text{N}-$ | <br>$n=0-5$   | <br>$n=1-6$<br>oligoaniline   |          |
| $-\text{SiCl}_3$                                 | $-\text{OH}$ |                           | <br>B → π → B   | <br>A → π → A                 | SC/SC    |
|  | $-\text{OH}$ |                           | naphtalene<br>perylene<br>terylene<br>anthracene<br>pentacene | porphine<br>phthalocyanine    |          |

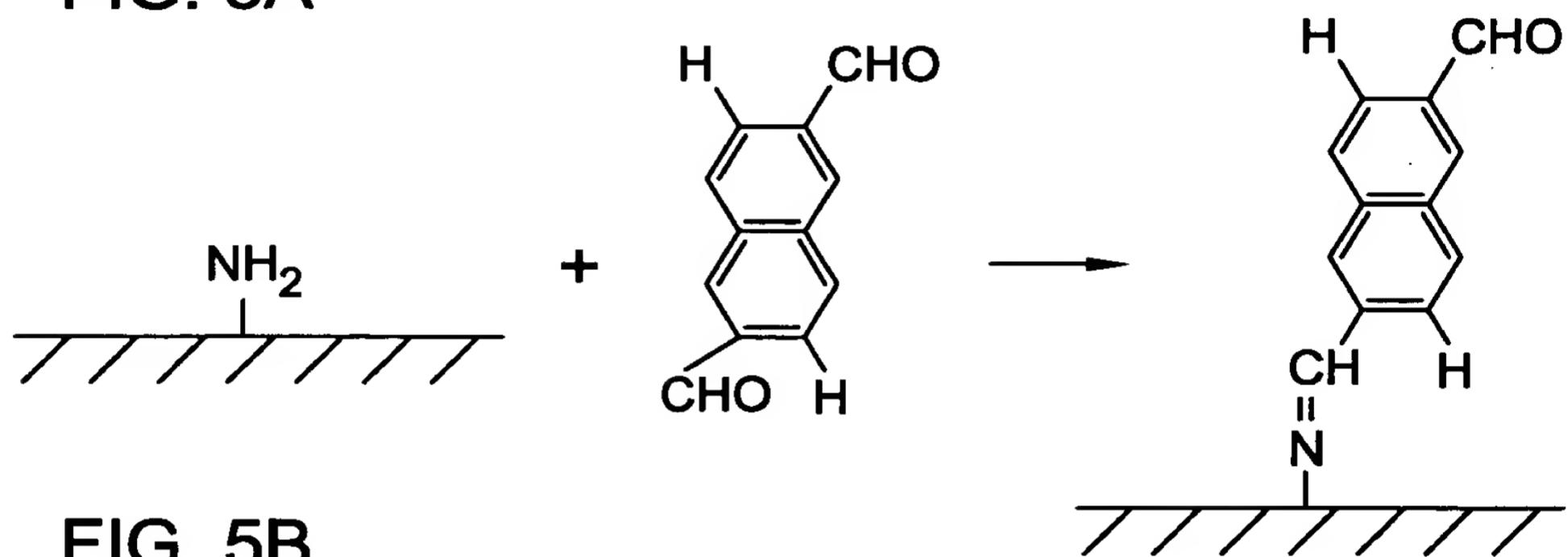
FIG. 3B

**FIG. 4A****FIG. 4B****FIG. 4C**

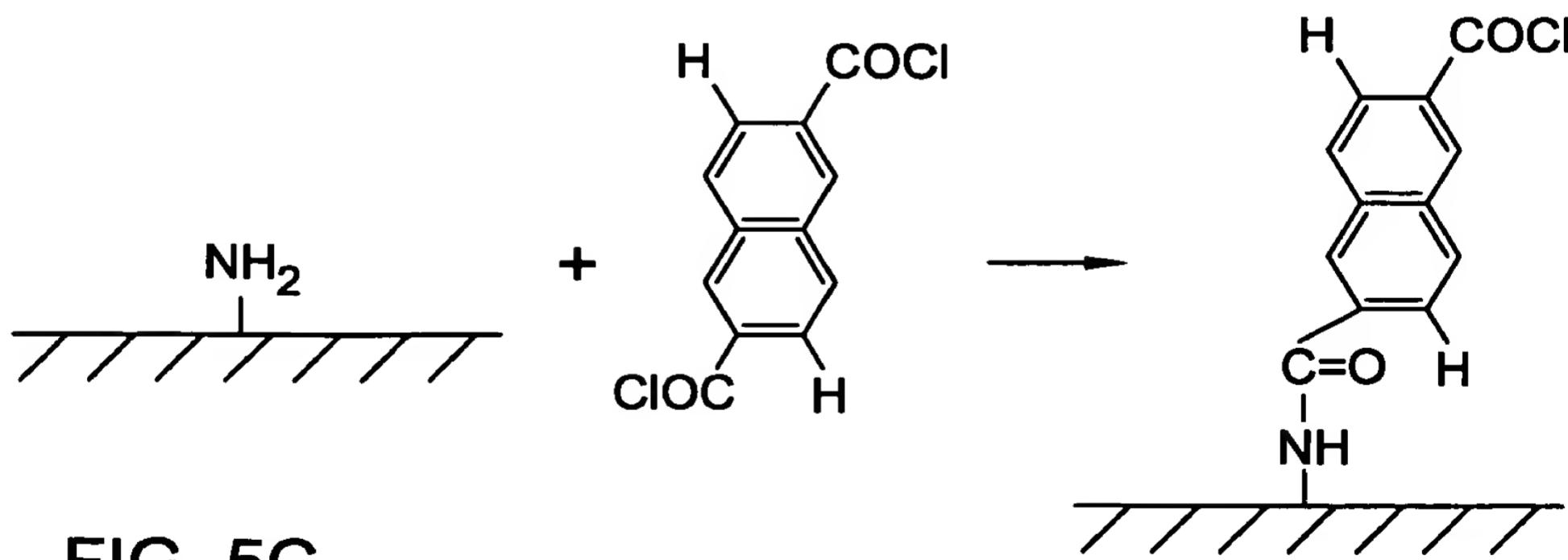
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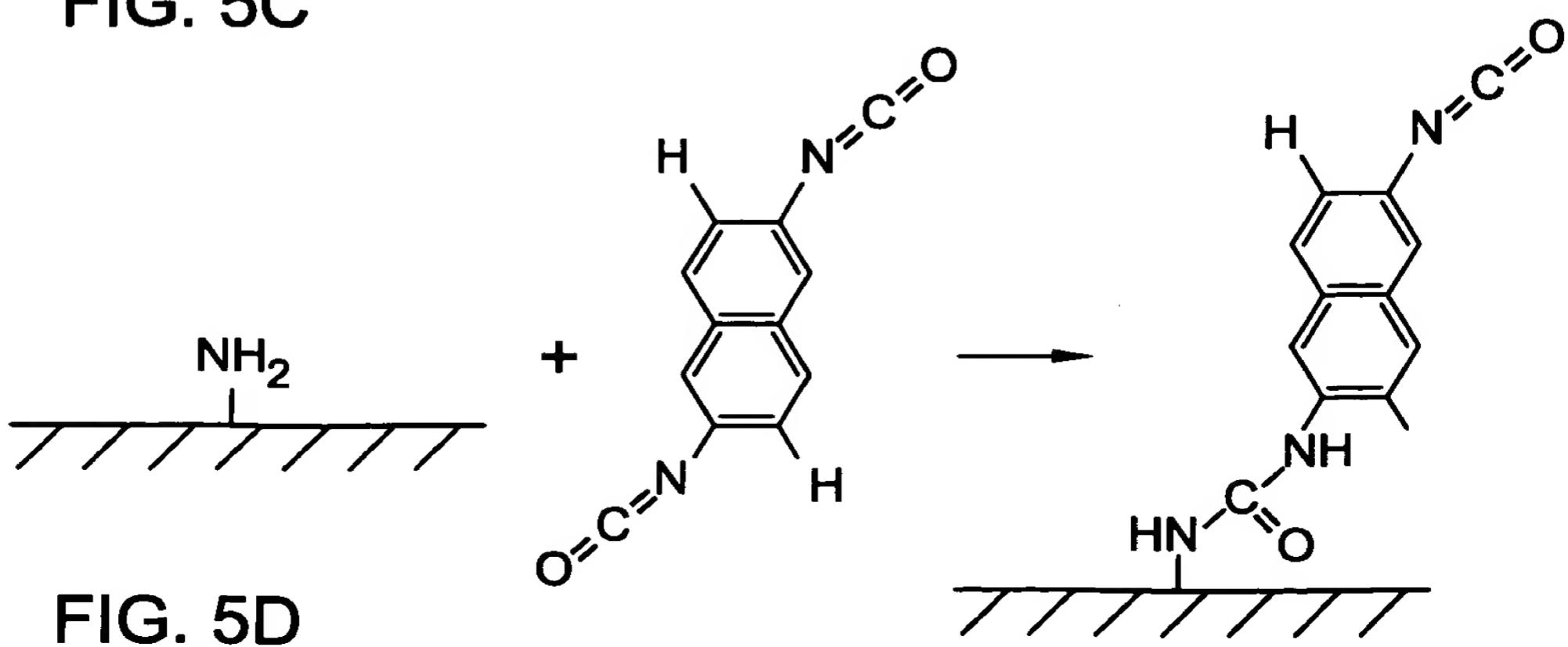
**FIG. 5A**



**FIG. 5B**



**FIG. 5C**



**FIG. 5D**

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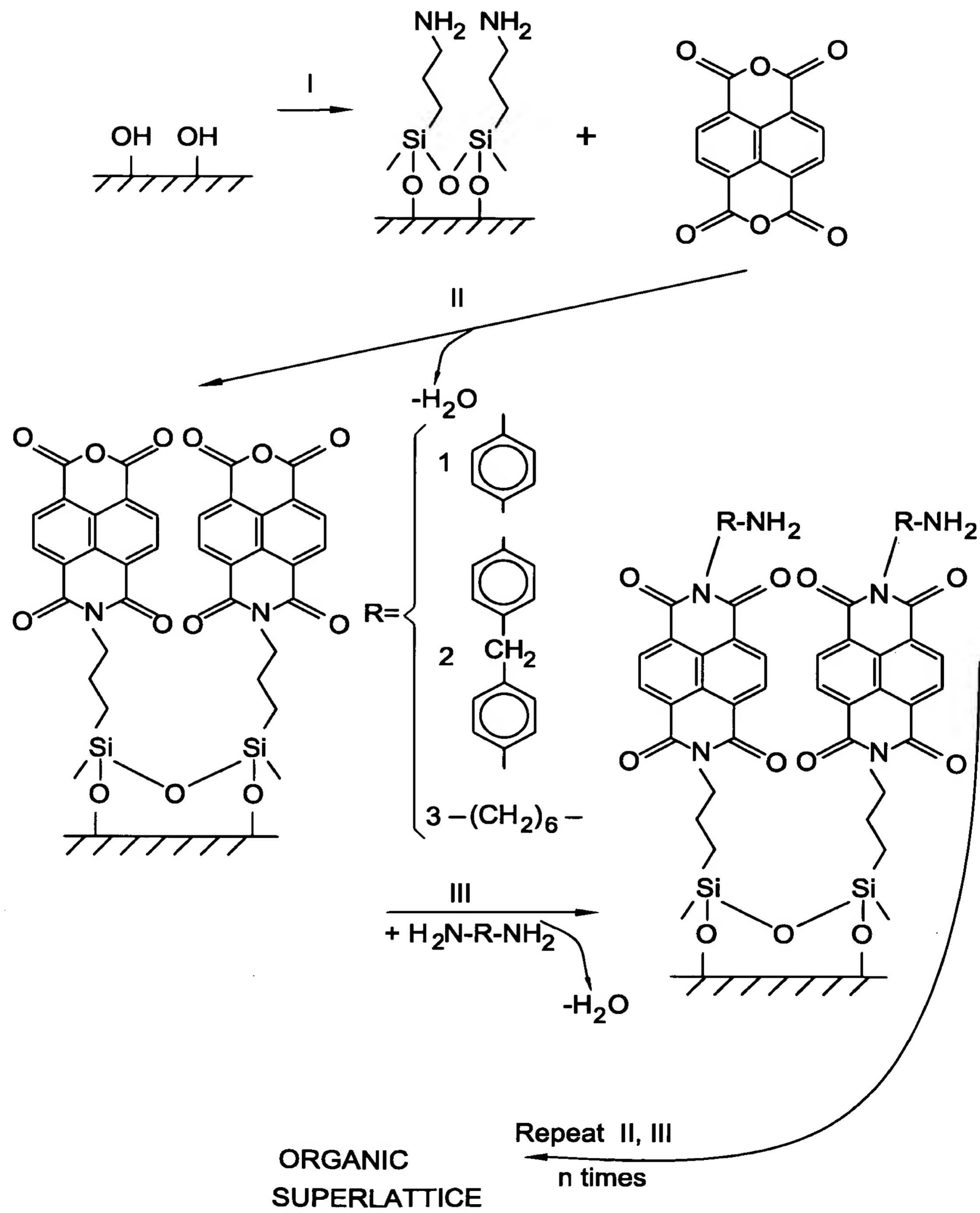


FIG. 6

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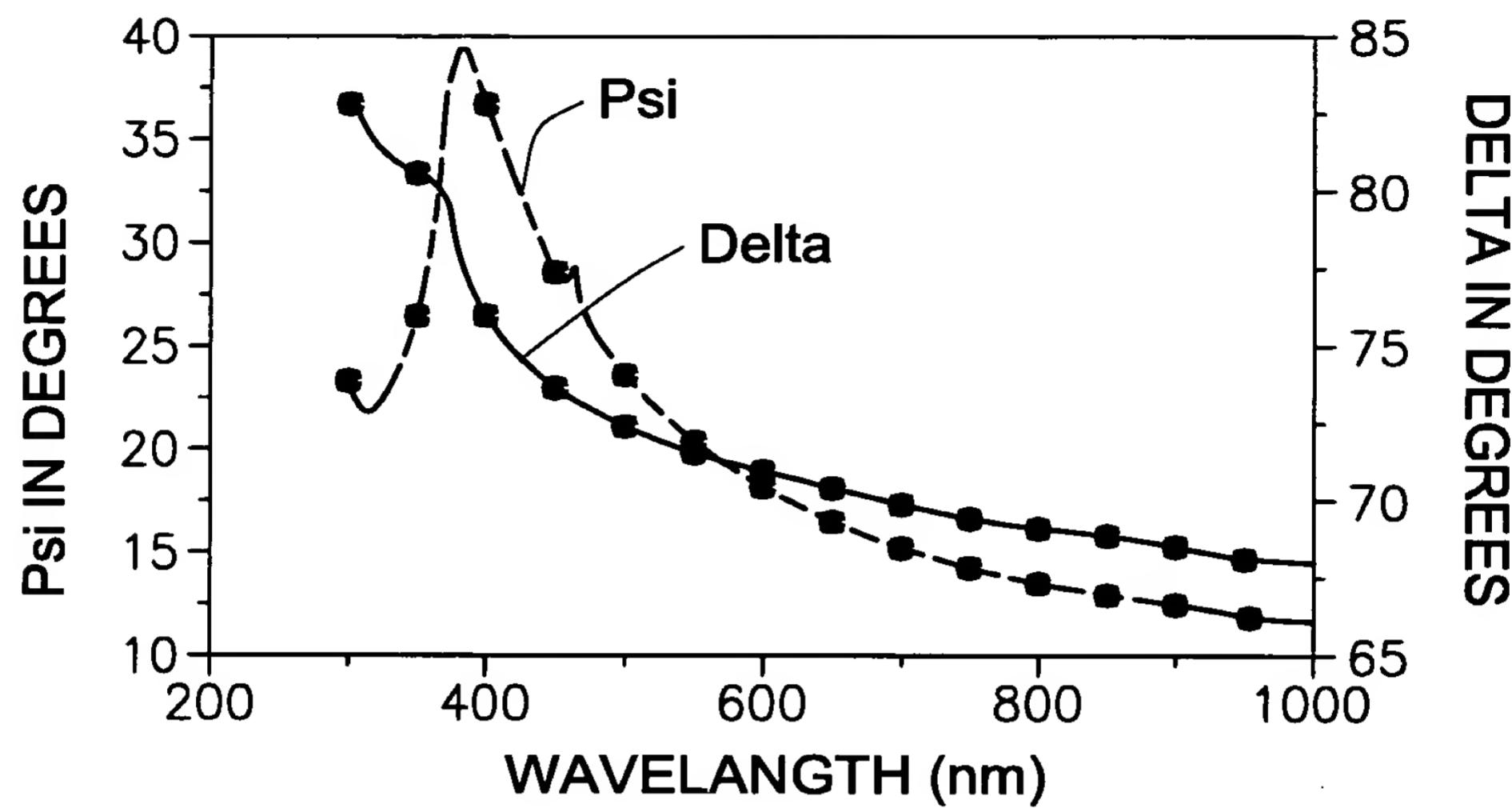


FIG. 7

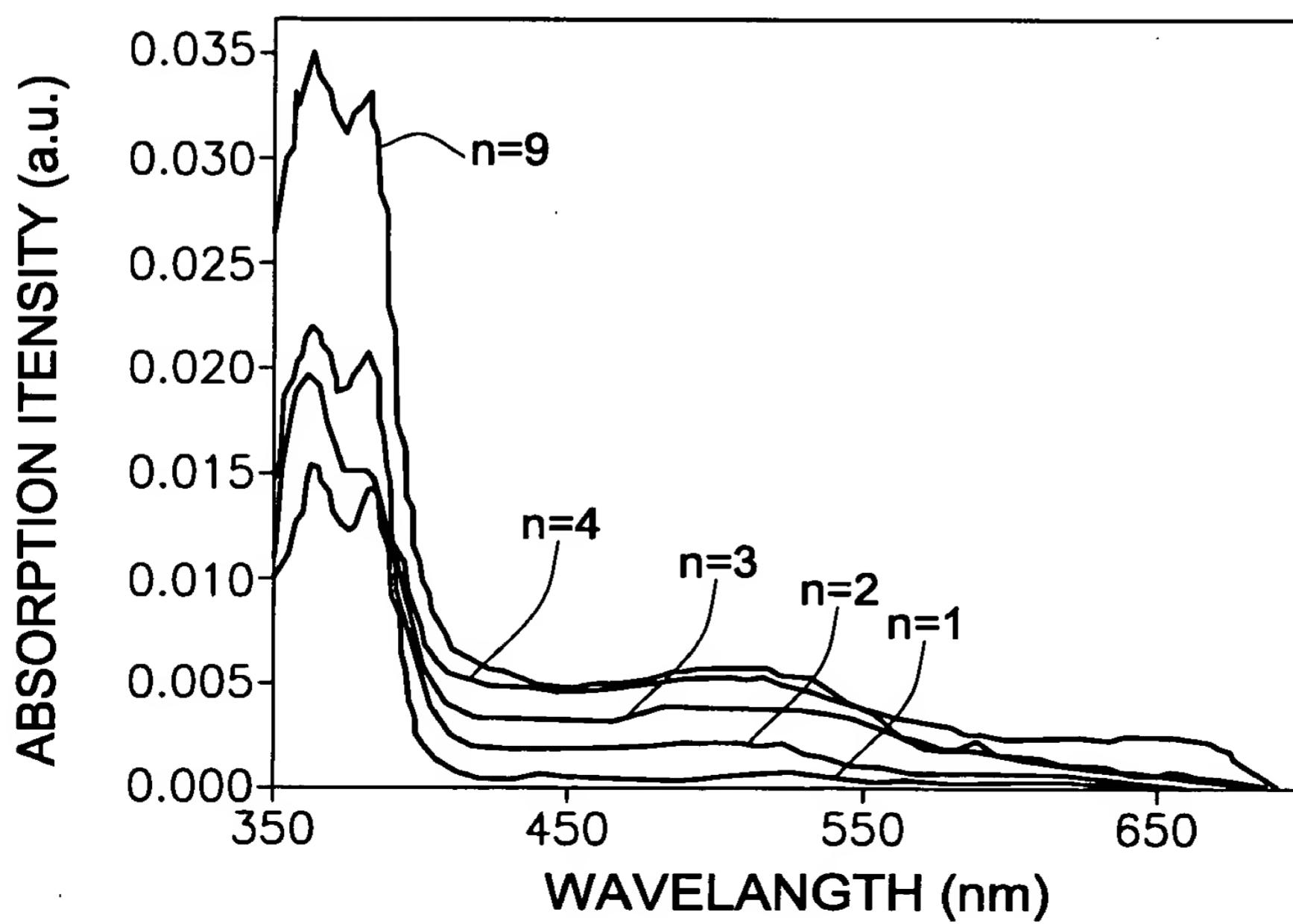


FIG. 8

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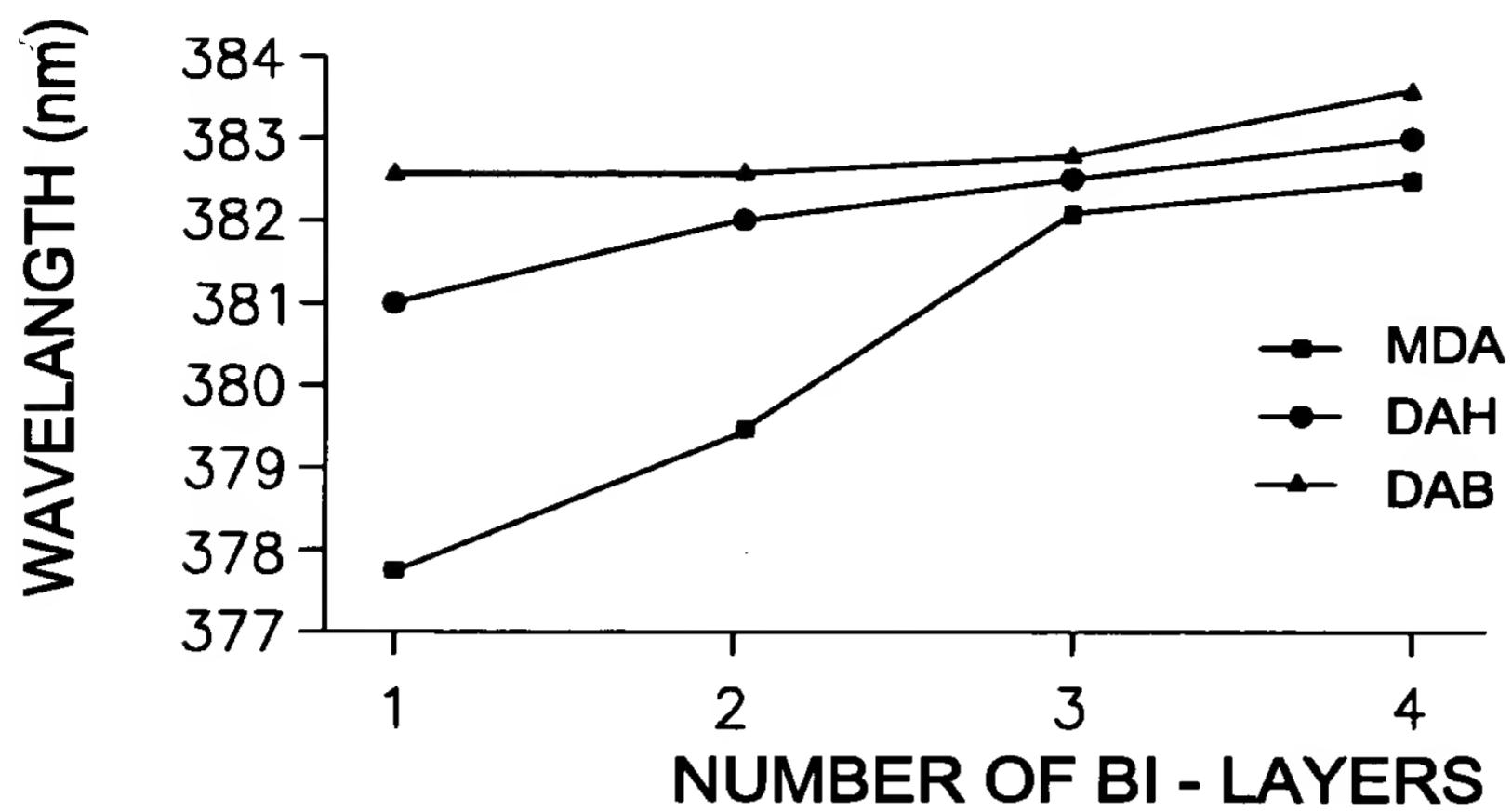


FIG. 9

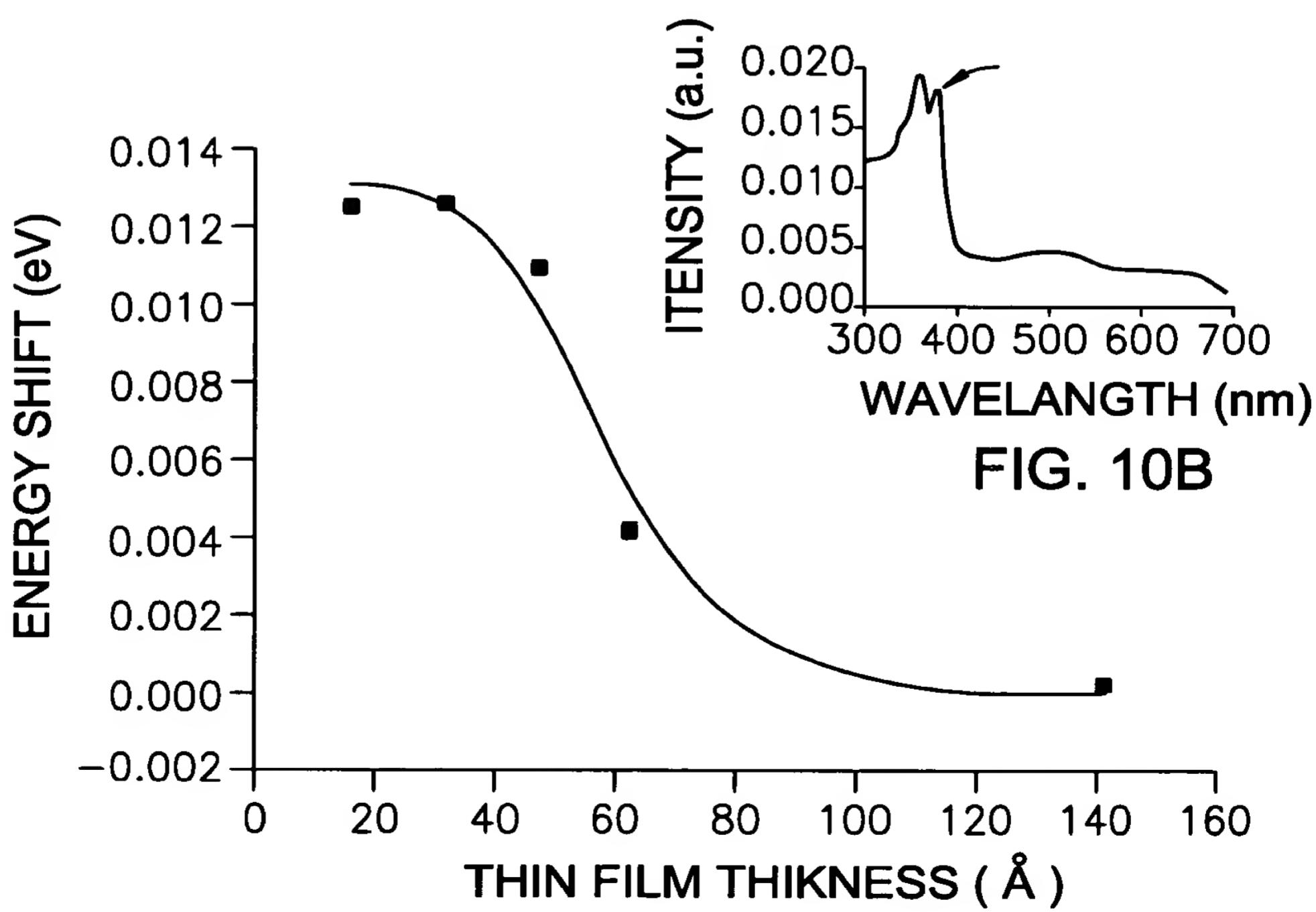


FIG. 10A

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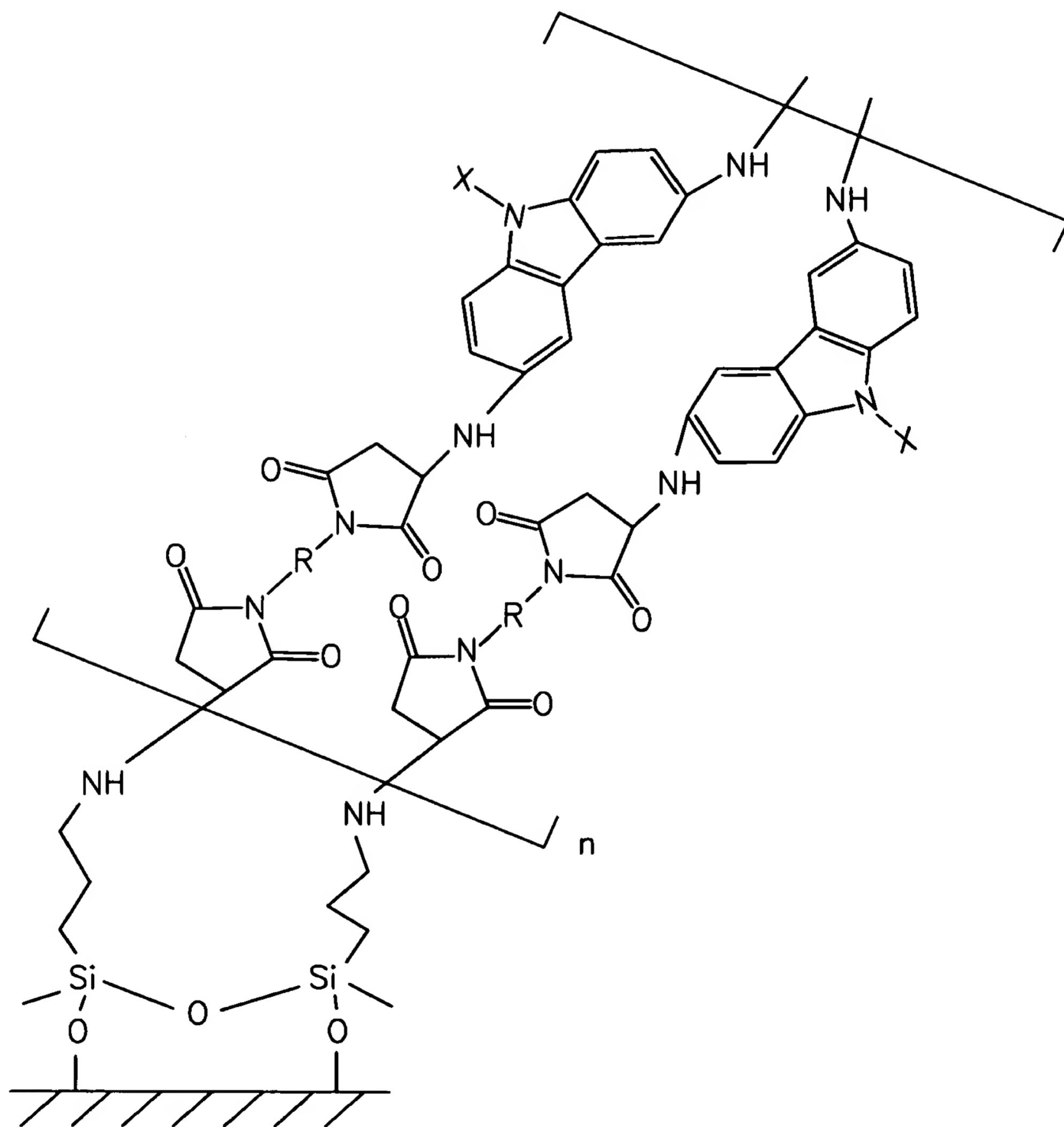


FIG. 11

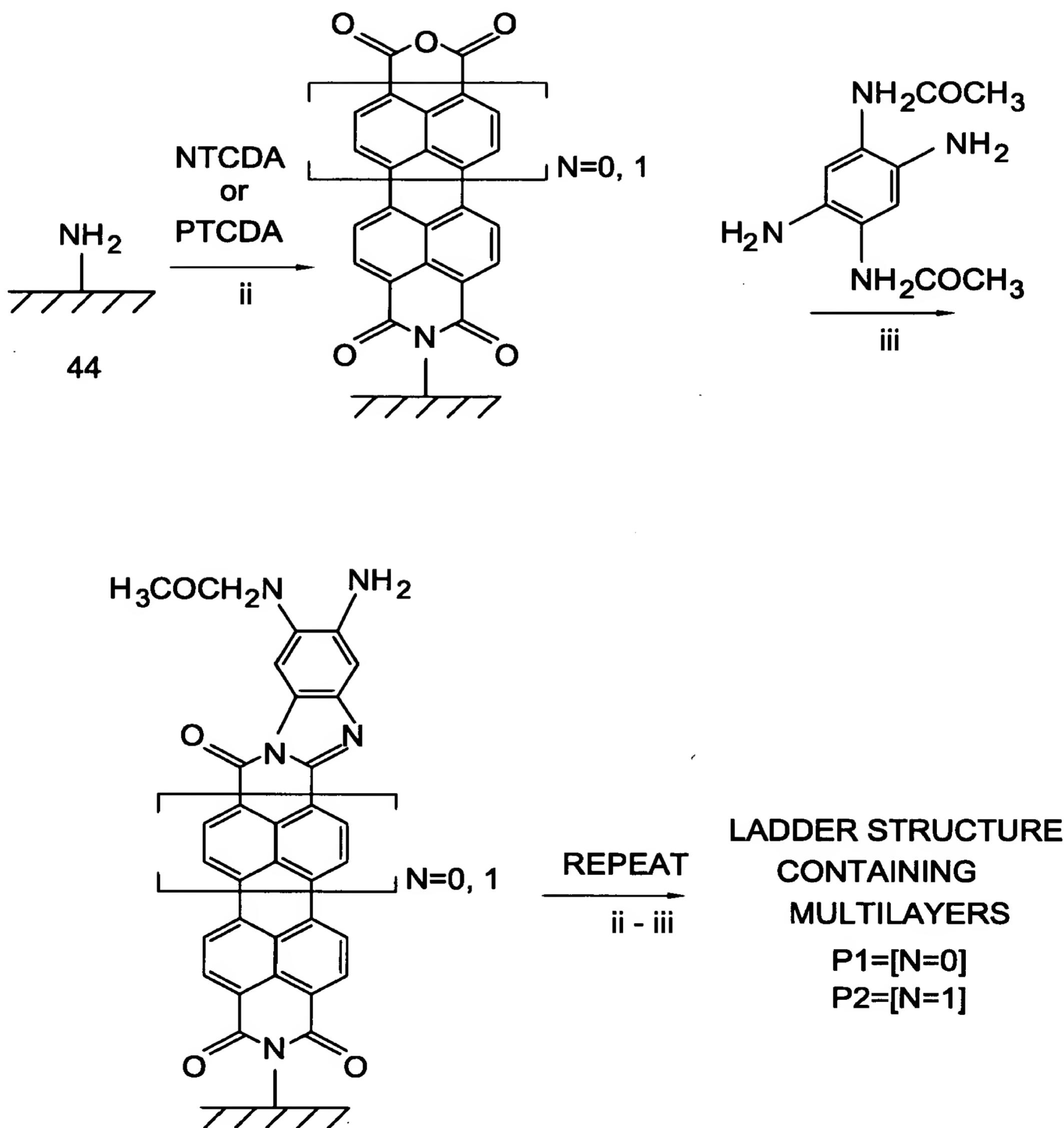


FIG. 12A

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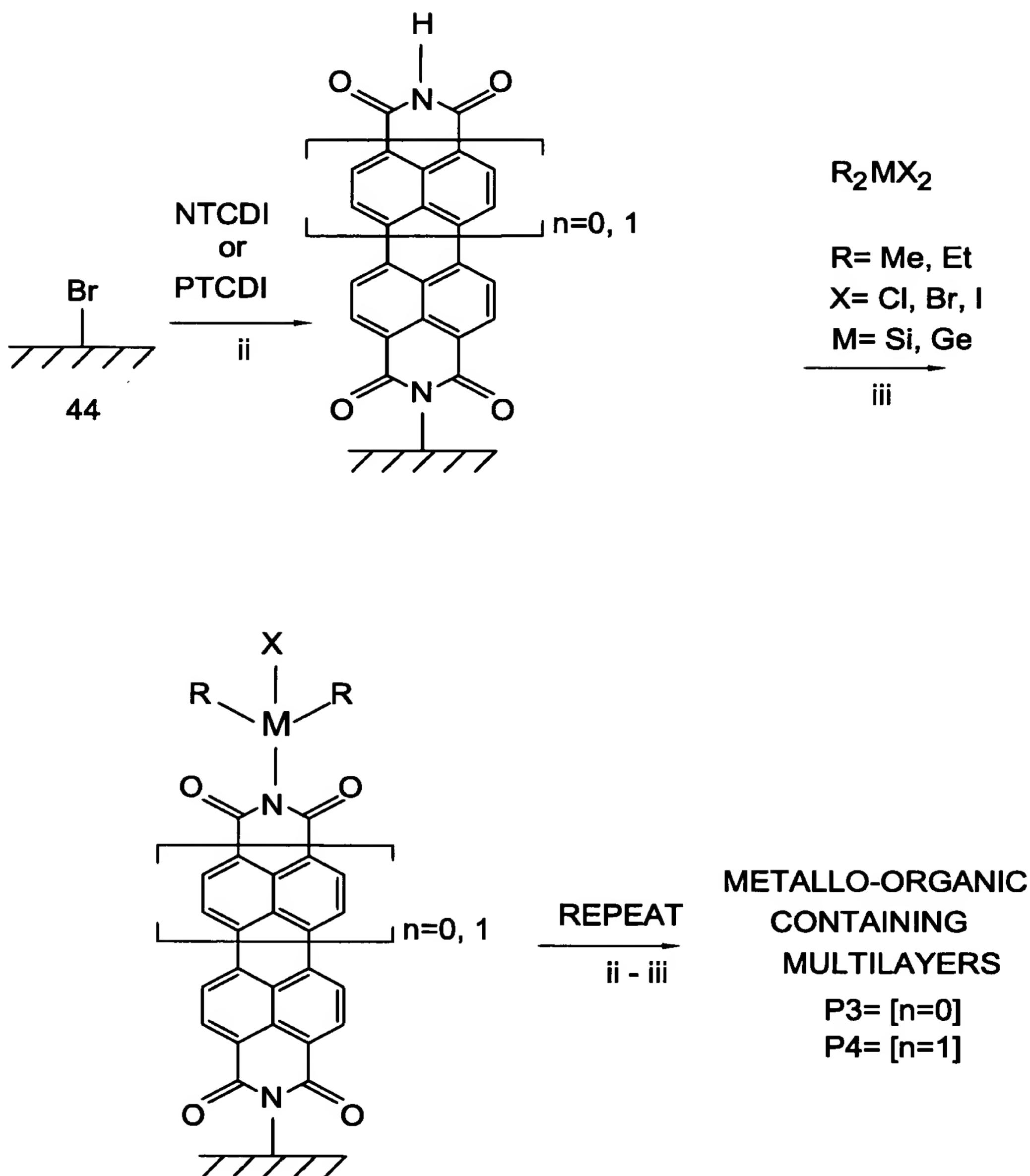


FIG. 12B

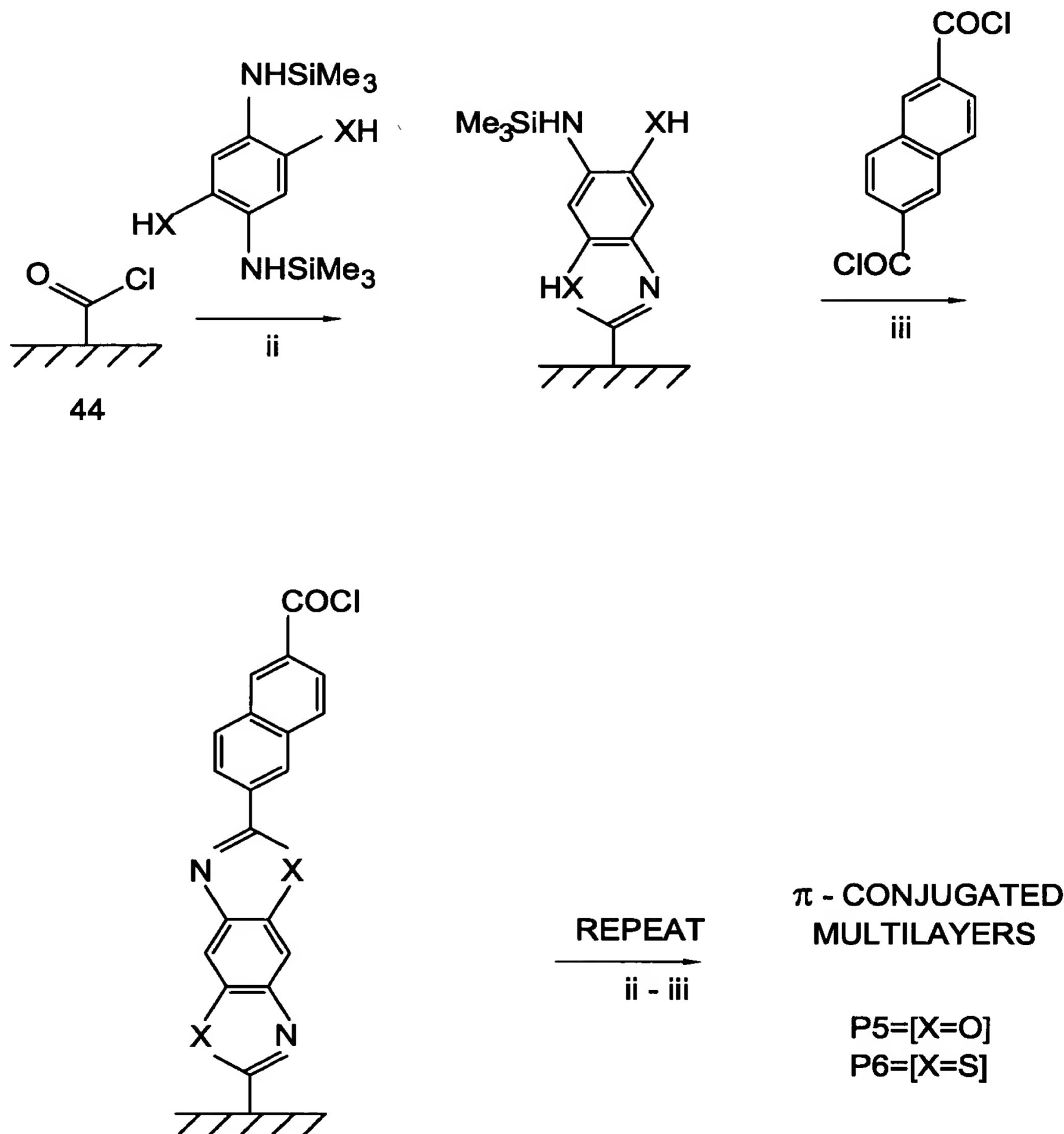


FIG. 12C

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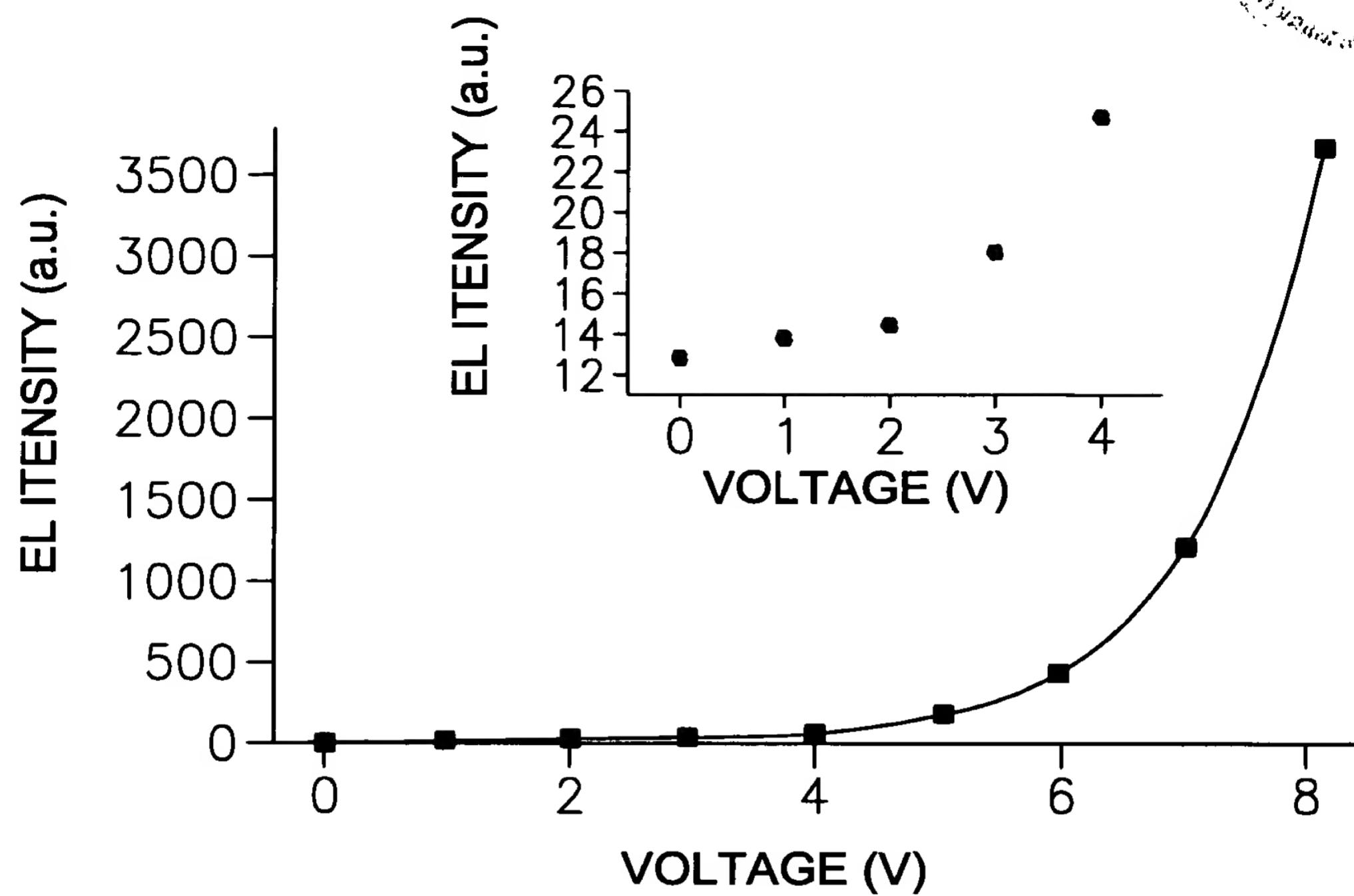


FIG. 13A

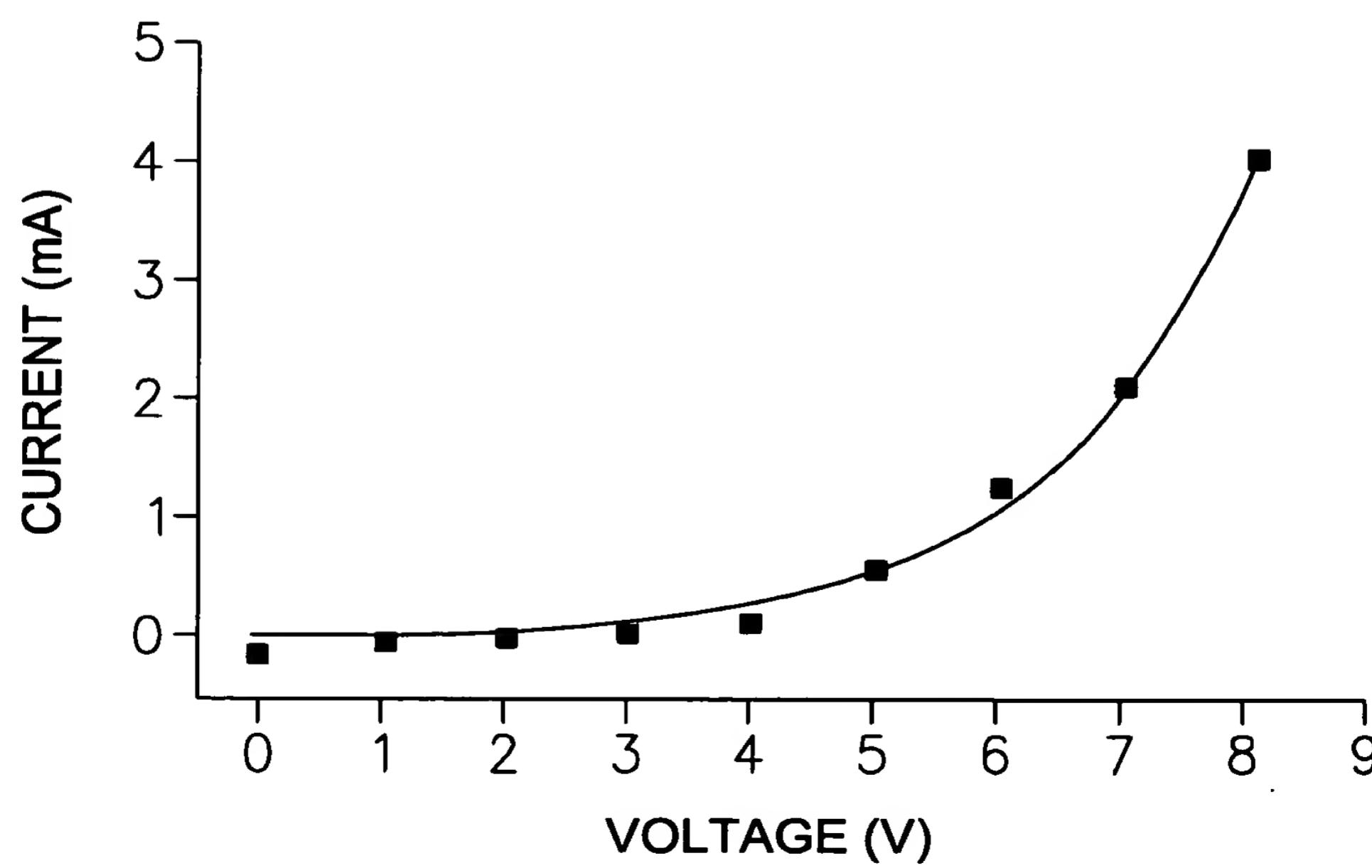


FIG. 13B



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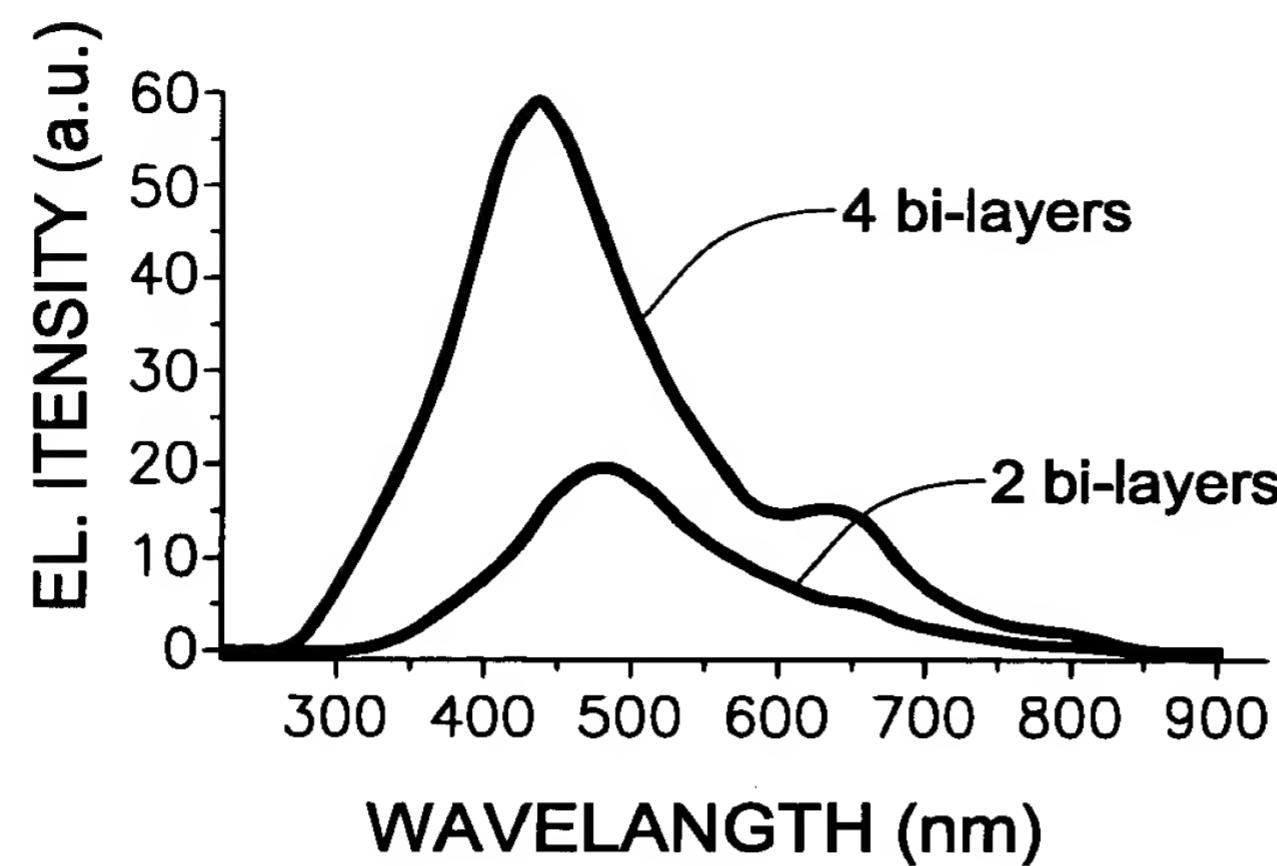


FIG. 14

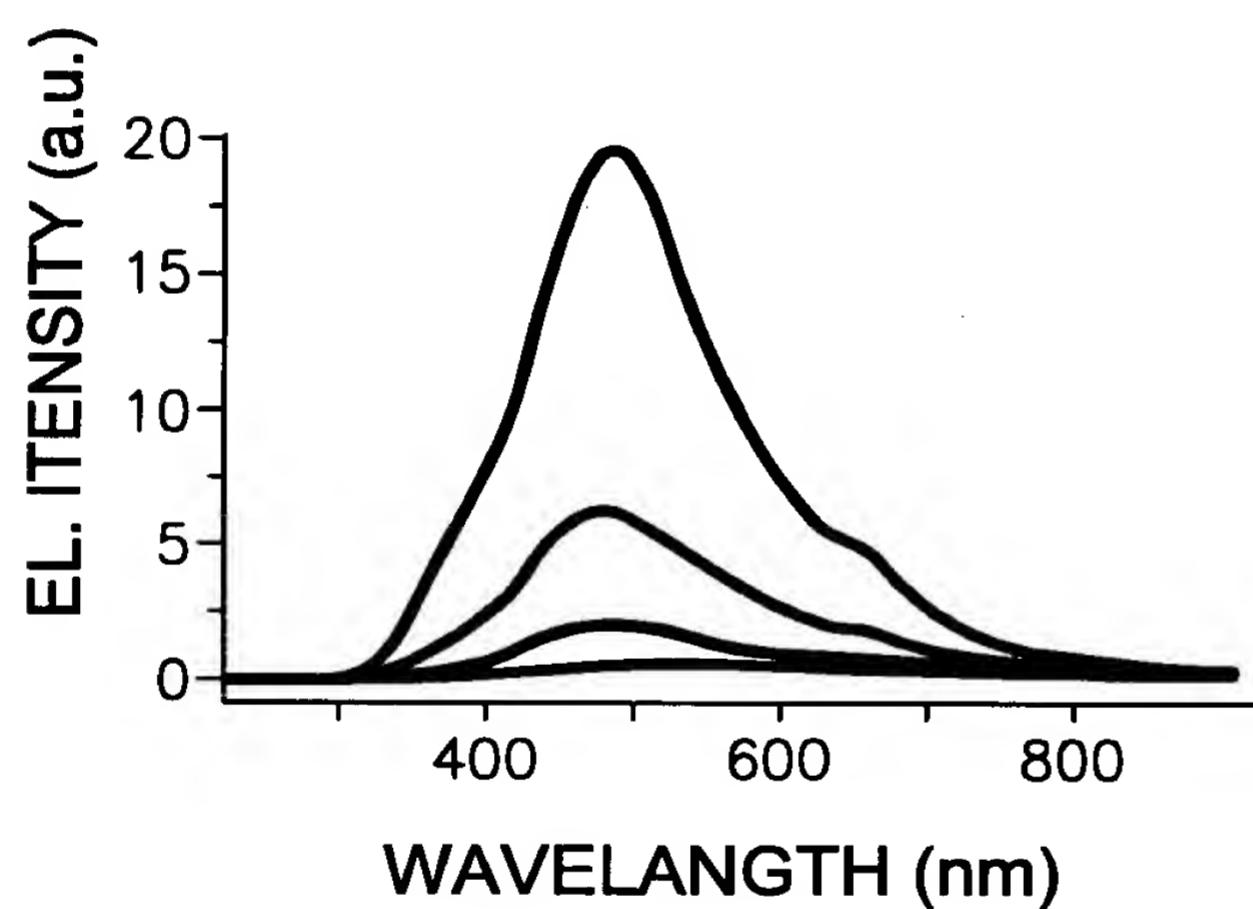


FIG. 15

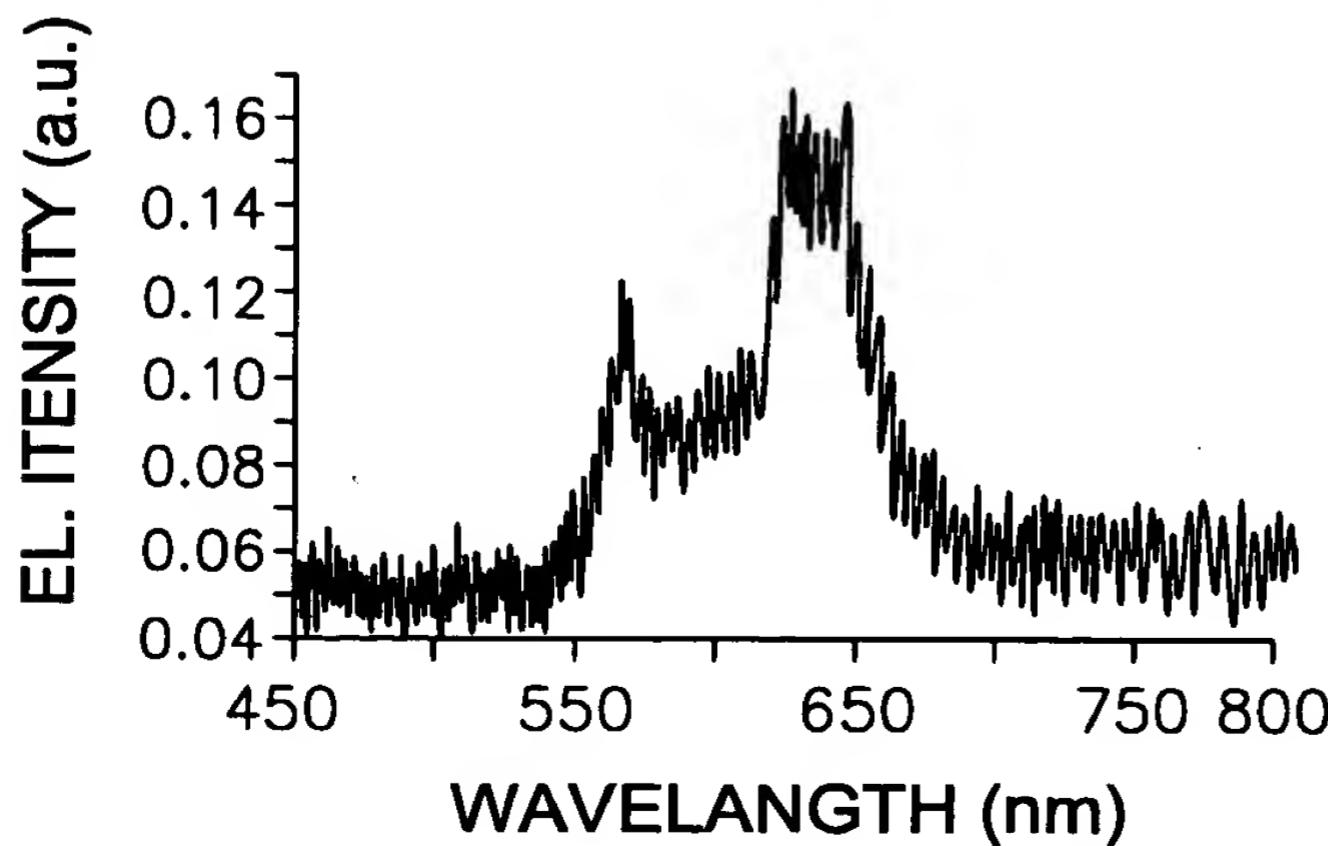


FIG. 16

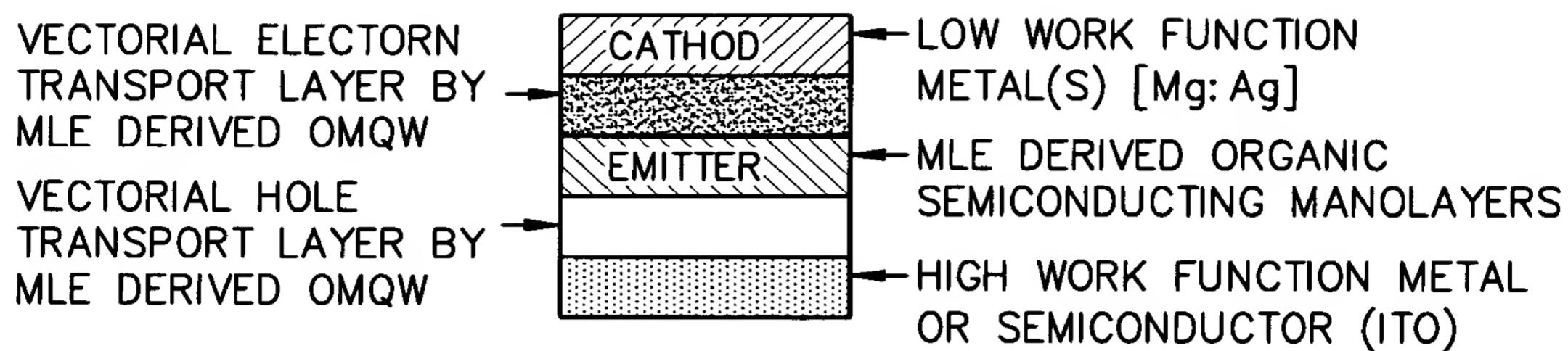


FIG. 17A

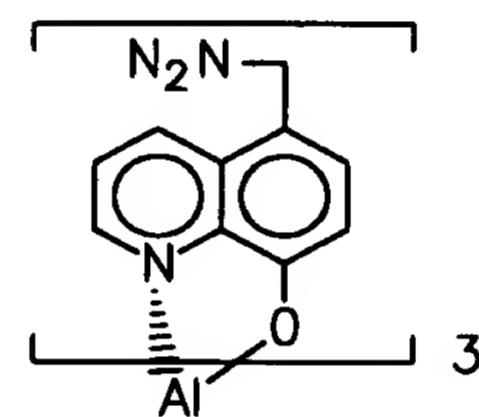


FIG. 17B

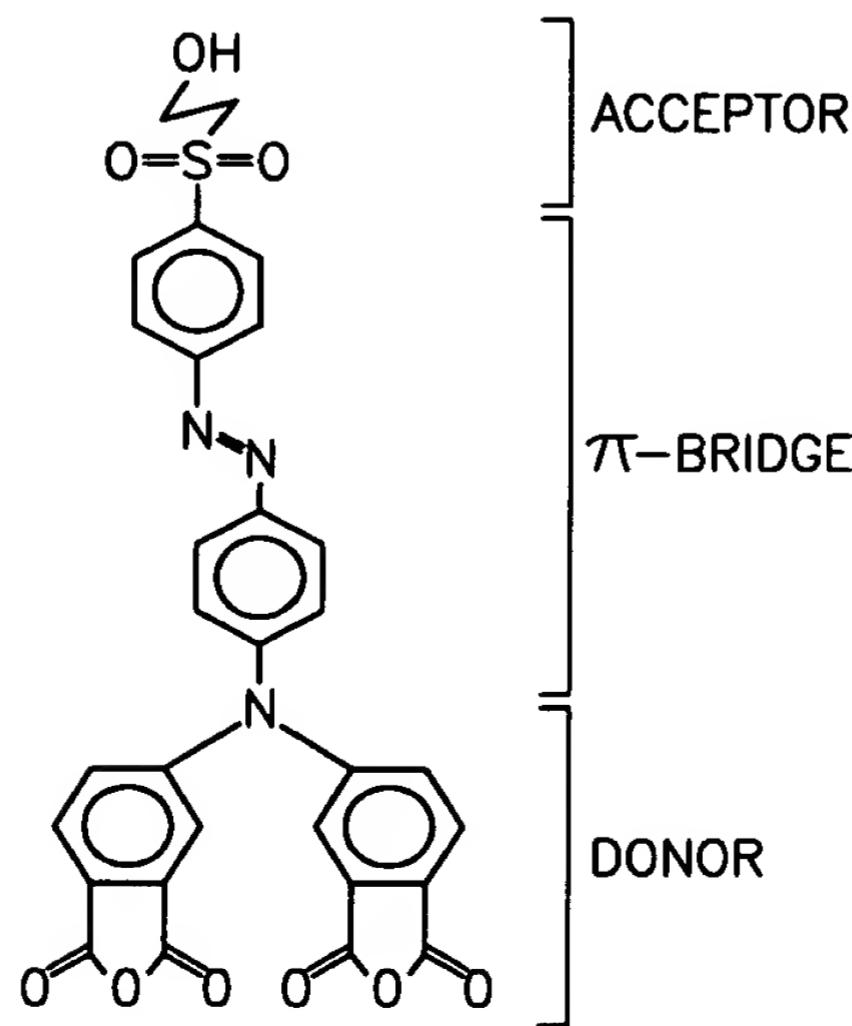


FIG. 18

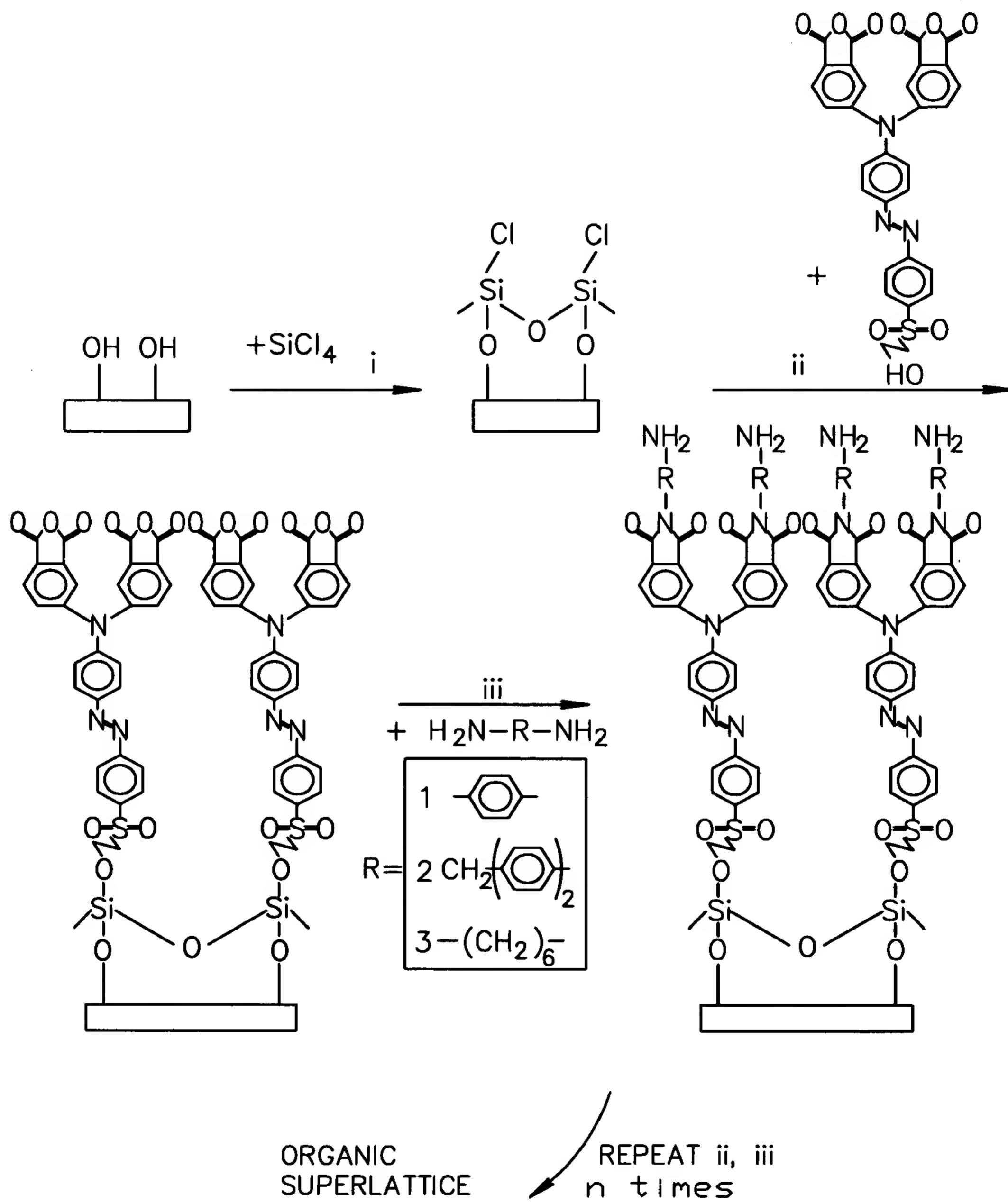


FIG. 19